

CLAIMS

1. A safe injection device comprising a syringe having a syringe body (10), a needle (11), and a piston (12) suitable for moving in the body to perform an injection, and safety means comprising a protective sheath (16), the syringe body and the protective sheath (16) being suitable for sliding relative to each other between an injection configuration in which the needle (11) projects beyond the protective sheath (16) which is disposed around the syringe body (10), and a protection configuration in which the needle extends inside said sheath, the device including a trigger member (30) suitable for causing the device to pass from the injection configuration to the protection configuration at the end of the injection stroke,

the device being characterized in that the trigger member (30) is secured to the actuator head (12B) of the piston (12), in that it comprises an inhibitor member (34) suitable for occupying an inhibit position in which said inhibitor member defines a first end-of-injection-stroke position for the piston in which the trigger member (30) is unsuitable for causing the device to pass from the injection configuration to the protection configuration, and is suitable for being moved from said inhibit position to enable the piston to reach a second end-of-injection-stroke position in which the trigger member (30) is suitable for causing the device to pass from the injection configuration to the protection configuration, in that in its inhibit position, the inhibitor member (34) is connected to the piston (12), being constrained to move therewith and is suitable for co-operating in abutment with an element (10B) of the device that is stationary relative to the syringe body (10) to define the first end-of-injection-stroke position, in that the inhibitor member (34) is suitable for being separated from the piston (12) or displaced relative thereto to enable the second end-of-injection-

stroke position to be reached, and in that in its inhibit position, the inhibitor member (34) is connected to the actuator head (12B) of the piston.

5 2. A device according to claim 1, characterized in that, in its inhibit position, the inhibitor member (34) passes through the head (12B) of the piston (12).

10 3. A safe injection device comprising a syringe having a syringe body (10), a needle (11), and a piston (12) suitable for moving in the body to perform an injection, and safety means comprising a protective sheath (16), the syringe body and the protective sheath (16) being suitable for sliding relative to each other between an
15 injection configuration in which the needle (11) projects beyond the protective sheath (16) which is disposed around the syringe body (10), and a protection configuration in which the needle extends inside said sheath, the device including a trigger member (30)
20 suitable for causing the device to pass from the injection configuration to the protection configuration at the end of the injection stroke,

the device being characterized in that it includes means (34; 50) for defining a first end-of-injection-stroke situation in which the trigger member is
25 unsuitable for causing the device to pass from the injection configuration to the protection configuration, and a second end-of-injection-stroke situation in which the trigger member (30) is suitable for causing the
30 device to pass from the injection configuration to the protection configuration, in that the trigger member (30) is constrained to move with the piston (12), in that it includes means (34) for defining first and second end-of-injection-stroke positions for the piston (12)
35 corresponding respectively to the first and second end-of-injection-stroke situations, in that it includes a housing (40) in which the head (12B) of the piston (12)

is substantially retracted in the second end-of-injection-stroke position, and in that, in the first end-of-injection-stroke position, the piston head projects beyond said housing to provide a purchase enabling the piston to be pulled away from the needle.

4. A device according to claim 3, characterized in that it includes an inhibitor member (34) suitable for occupying an inhibit position in which the end-of-injection-stroke situation is said first situation, and suitable for being moved relative to said inhibit position to enable the end-of-injection-stroke situation to be said second situation.

5. A device according to claim 3 or claim 4, characterized in that it includes abutment means (38A, 10B) suitable for being put into operation to define the first end-of-injection-stroke position and for being taken out of operation to enable the second end-of-injection-stroke position to be reached.

6. A device according to claims 4 and 5, characterized in that, in its inhibit position, the inhibitor member (34) is connected to the piston (12) being constrained to move therewith, and is suitable for co-operating in abutment with an element (10B) of the device that is stationary relative to the syringe body (10) in order to define the first end-of-injection-stroke position.

7. A device according to claim 6, characterized in that the inhibitor member (34) is suitable for being separated from the piston (12) or for being displaced relative thereto, in order to enable the second end-of-injection-stroke position to be reached.

8. A device according to claim 6 or claim 7, characterized in that the trigger member (30) is secured

to the actuator head (12B) of the piston (12), and in that, in its inhibit position, the inhibitor member (34) is connected to said head (12B).

5 9. A device according to claim 8, characterized in that, in its inhibit position, the inhibitor member (34) passes through the head (12B) of the piston (12).

10 10. A safe injection device comprising a syringe having a syringe body (10), a needle (11), and a piston (12) suitable for moving in the body to perform an injection, and safety means comprising a protective sheath (16), the syringe body and the protective sheath (16) being suitable for sliding relative to each other between an
15 injection configuration in which the needle (11) projects beyond the protective sheath (16) which is disposed around the syringe body (10), and a protection configuration in which the needle extends inside said sheath, the device including a trigger member (30)
20 suitable for causing the device to pass from the injection configuration to the protection configuration at the end of the injection stroke,

the device being characterized in that the trigger member (30) is formed by a skirt secured to the piston
25 head, in that it includes an inhibitor member formed by a part (34) that, in an inhibit position, is fitted on the head (12B) of the piston and presents an end (38A) suitable for coming into abutment against an element that is stationary relative to the syringe body in order to
30 define a first end-of-injection-stroke position for the piston in which the skirt (30) is unsuitable for causing the device to pass from the injection configuration to the protection configuration, and that is suitable for being separated from the head of the piston in order to
35 enable a second end-of-injection-stroke position of the piston to be reached in which the skirt (30) is suitable

for causing the device to pass from the injection configuration to the protection configuration.

11. A device according to claim 10, characterized in that, in the inhibit position, the inhibitor part (34) passes through the head (12B) of the piston.

12. A safe injection device comprising a syringe having a syringe body (10), a needle (11), and a piston (12) suitable for moving in the body to perform an injection, and safety means comprising a protective sheath (16), the syringe body and the protective sheath (16) being suitable for sliding relative to each other between an injection configuration in which the needle (11) projects beyond the protective sheath (16) which is disposed around the syringe body (10), and a protection configuration in which the needle extends inside said sheath, the device including a trigger member (30) suitable for causing the device to pass from the injection configuration to the protection configuration at the end of the injection stroke,

the device being characterized in it includes means (34; 50) for defining a first end-of-injection-stroke situation in which the trigger member (30) is unsuitable for causing the device to pass from the injection configuration to the protection configuration, and a second end-of-injection-stroke situation in which the trigger member (30) is suitable for causing the device to pass from the injection configuration to the protection configuration, and in that the trigger member (52) is connected to the piston (12) and is suitable for being displaced relative thereto between a position suitable for triggering in which, at the end of the injection stroke of the piston said trigger member (52) is suitable for causing the device to pass from the injection configuration to the protection configuration, and a position unsuitable for triggering in which, at the end

of the injection stroke of the piston, the trigger member (52) is unsuitable for causing the device to pass from the injection configuration to the protection configuration.

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13. A device according to claim 12, characterized in that the trigger member (50) is axially movable relative to the piston (12), the position suitable for triggering being offset towards the end (12A) of the piston (12) that is directed towards the needle relative to the position that is unsuitable for triggering.

14. A device according to claim 13, characterized in that the sliding movement of the trigger member (50) relative to the piston (12) includes a hard point (53, 54A, 54B) for holding said trigger member in its position that is unsuitable for triggering.